DESIGN NOTES (Detail 4 - MH1 & MH3)

THE BASIS OF DESIGN WAS THE CDS2020-5-C UNIT PRODUCED BY CONTECH ENGINEERED SOLUTIONS. OTHER HYDRODYNAMIC SEPARATORS WILL BE ACCEPTABLE IF THEY MEET THE SALIENT FEATURES LISTED BELOW AND ARE CAPABLE OF TREATING WATER QUALITY TREATMENT FLOWRATE OF 1.1 CFS. THE UNIT MUST BE ABLE TO BYPASS PEAK FLOW RATES THAT EXCEED THE TREATMENT FLOWRATE.

GENERAL NOTES

1. THE STORMWATER TREATMENT DEVICE (SWTD) SHALL BE CAPABLE OF ACHIEVING AN 80 PERCENT AVERAGE ANNUAL REDUCTION IN THE TOTAL SUSPENDED SOLID LOAD.

2. THE SWTD SHALL BE CAPABLE OF CAPTURING AND RETAINING 100 PERCENT OF POLLUTANTS GREATER THAN OR EQUAL TO 2.4 MILLIMETERS (MM) REGARDLESS OF THE POLLUTANT'S SPECIFIC GRAVITY (I.E.: FLOATABLE AND NEUTRALLY BUOYANT MATERIALS)FOR FLOWS UP TO THE DEVICE'S RATED-TREATMENT CAPACITY.

3. THE SWTD SHALL BE CAPABLE OF CAPTURING AND RETAINING TOTAL PETROLEUM HYDROCARBONS. THE SWTD SHALL BE CAPABLE OF ACHIEVING A REMOVAL EFFICIENCY OF 92 AND 78 PERCENT WHEN THE DEVICE IS OPERATING AT 25 AND 50 PERCENT OF ITS RATED-TREATMENT CAPACITY. THE SWTD SHALL BE GREATER THAN 99 PERCENT EFFECTIVE IN CONTROLLING DRY-WEATHER ACCIDENTAL OIL SPILLS

4. THE SWTD SHALL BE CAPABLE OF UTILIZING SORBENT MEDIA TO ENHANCE REMOVAL AND RETENTION OF PETROLEUM BASED POLLUTANTS

5. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.

6. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT MANUFATURER REPRESENTATIVE.

7. WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.

8. STRUCTURE AND CASTINGS SHALL MEET AASHTO HS20 LOAD RATING.
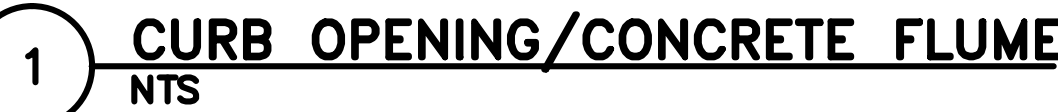
INSTALLATION NOTES

1. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.

2. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE MANHOLE STRUCTURE (LIFTING CLUTCHES PROVIDED).

3. CONTRACTOR TO ADD JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS, AND ASSEMBLE STRUCTURE.

4. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH PIPE INVERTS WITH ELEVATIONS SHOWN.

5. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

PLAN VIEW B-B — N.T.S.

ELEVATION A-A — N.T.S.

○ 4 **HYDRODYNAMIC SEPARATORS (MH1 & MH3) DETAILS**
NTS — FOR RAINWATER HARVESTING SYSTEM

DESIGN NOTES (Detail 2 - D2-0A)

THE BASIS OF DESIGN WAS THE CDS3025-6-C UNIT PRODUCED BY CONTECH ENGINEERED SOLUTIONS. OTHER HYDRODYNAMIC SEPARATORS WILL BE ACCEPTABLE IF THEY MEET THE SALIENT FEATURES LISTED BELOW AND ARE CAPABLE OF TREATING WATER QUALITY VOLUME AS SPECIFIED ON DATA SHEETS SHOWN HERE.

GENERAL NOTES

1. THE STORMWATER TREATMENT DEVICE (SWTD) SHALL BE SIZED TO EITHER ACHIEVE AN 80 PERCENT AVERAGE ANNUAL REDUCTION IN THE TOTAL SUSPENDED SOLID LOAD OR TREAT A FLOW RATE DESIGNATED BY THE JURISDICTION IN WHICH THE PROJECT IS LOCATED.

2. THE SWTD SHALL BE CAPABLE OF CAPTURING AND RETAINING 100 PERCENT OF POLLUTANTS GREATER THAN OR EQUAL TO 2.4 MILLIMETERS (MM) REGARDLESS OF THE POLLUTANT'S SPECIFIC GRAVITY (I.E.: FLOATABLE AND NEUTRALLY BUOYANT MATERIALS) FOR FLOWS UP TO THE DEVICE'S RATED-TREATMENT CAPACITY. THE CDS UNIT SHALL BE FITTED WITH A 2400 MICRON STAINLESS STEEL SCREEN

3. THE SWTD SHALL BE CAPABLE OF CAPTURING AND RETAINING TOTAL PETROLEUM HYDROCARBONS. THE SWTD SHALL BE CAPABLE OF ACHIEVING A REMOVAL EFFICIENCY OF 92 AND 78 PERCENT WHEN THE DEVICE IS OPERATING AT 25 AND 50 PERCENT OF ITS RATED-TREATMENT CAPACITY

4. THE SWTD SHALL BE GREATER THAN 99 PERCENT EFFECTIVE IN CONTROLLING DRY-WEATHER ACCIDENTAL OIL SPILLS

5. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.

6. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT MANUFATURER REPRESENTATIVE.

7. WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.

8. STRUCTURE AND CASTINGS SHALL MEET AASHTO HS20 LOAD RATING.

INSTALLATION NOTES

1. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.

2. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE MANHOLE STRUCTURE (LIFTING CLUTCHES PROVIDED).

3. CONTRACTOR TO ADD JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS, AND ASSEMBLE STRUCTURE.

4. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH PIPE INVERTS WITH ELEVATIONS SHOWN.

5. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

PLAN VIEW — N.T.S.

FRAME AND COVER (DIAMETER VARIES) — N.T.S.

SECTION A-A — N.T.S.

○ 2 **HYDRODYNAMIC SEPARATOR (D2-0A) DETAILS**
NTS — FOR OUTFALL PIPE

Detail 1 - Curb Opening/Concrete Flume

PLAN

6" CURB & GUTTER

SECTION A-A
- #3 BARS @ 12" C/C
- 2-#3 BARS

SECTION B-B
- EXTEND BARS 6" INTO GUTTER
- #3 @ 12" EACH WAY

○ 1 **CURB OPENING/CONCRETE FLUME**
NTS

Detail 3 - Hydrodynamic Separator (D2-0A) Data Sheet

Page 1 of 2

Project: U.S. Army Intelligence and Security Command
Location: Fort Belvoir, VA
Prepared For: SAIC

Purpose: To calculate the first flush runoff flow rate (WQF) over a given site area. For this region the WQV to be analyzed is the runoff produced by the first 1.0" of rainfall.

Reference: United States Department of Agriculture Natural Resources Conservation Service TR-55 Manual

Given:

Structure Name	A (acres)	A (miles²)	Runoff Coefficient	Percent Imp. (%)*	t_c (min)	t_c (hr)
1	2.93	0.00458	0.64	56.67	5.0	0.083

* Assumes runoff coefficient of 0.3 for pervious areas and 0.9 for impervious areas.

Procedure: The Water Quality Flow (WQF) is calculated using the Water Quality Volume (WQV). This WQV, converted to watershed inches, is substituted for the runoff depth (Q) in the Natural Resources Conservation Service (formerly Soil Conservation Service), TR-55 Graphical Peak Discharge Method.

1. Compute WQV in watershed inches using the following equation:

$$WQV = P * R$$

where: WQV = water quality volume (watershed inches)
P = design precipitation (inches)
R = volumetric runoff coefficient = $0.05 + 0.009(I)$
I = percent impervious cover

Structure Name	Percent Imp. (%)	R	P (in)	WQV (in)	WQV (ac-ft)
1	56.67	0.560	1	0.560	0.1367

2. Compute the NRCS Runoff Curve Number (CN) using the following equation, or graphically using Figure 2-1 from TR-55 (USDA, 1986):

$$CN = 1000 / [10+5P+10Q-10(Q^2+1.25QP)^{1/2}]$$

where: CN = Runoff Curve Number
P = design precipitation (inches)
Q = runoff depth (watershed inches)

Structure Name	Q (in)	CN
1	0.560	95.00

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3. Using computed CN, read initial abstraction (I_a) from Table 4-1 in Chapter 4 of TR-55; compute I_a/P, interpolating when appropriate.

Structure Name	I_a (in)	I_a/P
1	0.105	0.105

4. Compute the time of concentration (t_c) in hours and the drainage area in square miles. A minimum t_c of 0.083 hours (5 minutes) should be used.

Structure Name	t_c (hr)	A (miles²)
1	0.083	0.00458

5. Read the unit peak discharge (q_u) from Exhibit 4-III in Chapter 4 of TR-55 for appropriate t_c for type III rainfall distribution.

Structure Name	t_c (hr)	I_a/P	q_u (csm/in)
1	0.083	0.105	1000

6. Substituting WQV (watershed inches) for runoff depth (Q), compute the water quality flow (WQF) from the following equation:

$$WQF = (q_u)*(A)*(Q)$$

where: WQF = water quality flow (cfs)
q_u = unit peak discharge (cfs/mi²/inch)
A = drainage area (mi²)
Q = runoff depth (watershed inches)

Structure Name	q_u (csm/in)	A (miles²)	Q (in)	WQF (cfs)
1	1000	0.00458	0.560	2.56

○ 3 **HYDRODYNAMIC SEPARATOR (D2-0A) — DATA SHEET**
NTS — FOR OUTFALL PIPE

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